

A new phreatic *Bogidiella* from subterranean waters of Sardinia (Crustacea Amphipoda, Gammaridae)

by

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With 2 figures

ABSTRACT

The new Amphipode species *Bogidiella silverii* n. sp. is described from subterranean fresh waters of Sardinia. The new species which can be included in the group of hyporheic interstitial species, is compared with *B. skopljensis* Karaman, *B. vandeli* Coineau and *B. chappuisi* Ruffo et Delamare-Deboutteville.

During a recent collecting trip in Sardinia, a few Gammarid Amphipods of the genus *Bogidiella* Hertzog were obtained from subterranean fresh waters of the southern part of the island.

Only three individuals were collected (a female and two immature stages) which were recognized as belonging to an undescribed species.

The preceding records of this genus from Sardinia are all of the central and northern part of the island: *B. vandeli* Coineau, 1968 was described from hyporheic habitat in the province of Nuoro (Rio Quirra), *B. ichnusae* Ruffo & Vigna Taglianti, 1975 also from hyporheic habitat of the province of Sassari (Liscia river), whereas a *B. "cfr. chappuisi"* was recorded from the Rio Isalle near Nuoro (RUFFO & VIGNA TAGLIANTI 1975).

The presence of *B. silverii* n. sp. in fresh-water wells in the plain north of Cagliari is of special interest as, following a traditional zoogeographical thesis, the underground fauna of the northern part of Sardinia should be in many ways different from that of the southern part of the island.

Many thanks are due to N. Coineau and G. S. Karaman for reading the manuscript and for their precious suggestions.

Bogidiella silverii n. sp.

Diagnosis. A phreatic *Bogidiella* with mesosomites higher than their length; outer lobe of maxilla I with nondentate spines, inner lobe with two apical setae; antenna I,

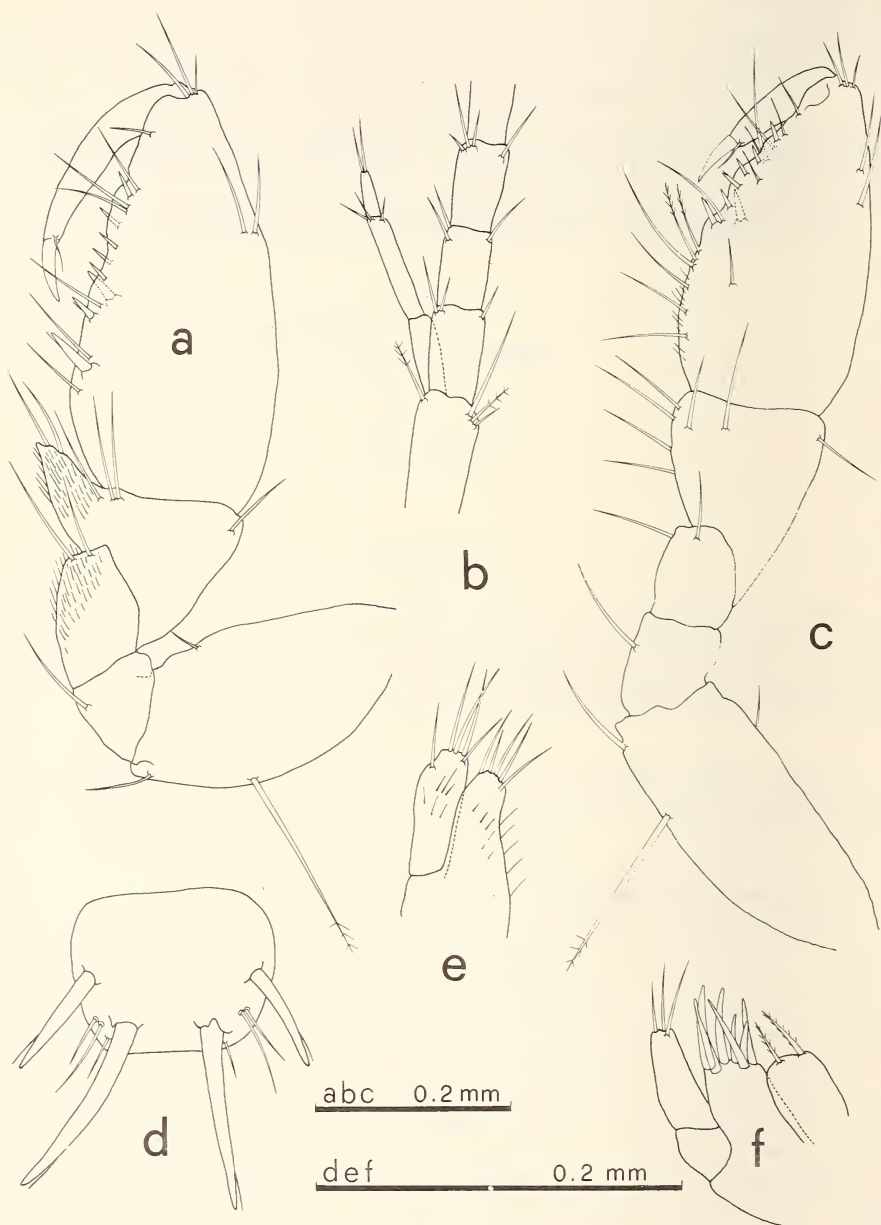


FIG. 1.

Bogidiella silverii n. sp.

a. gnathopod I; b. antenna I, accessory flagellum; c. gnathopod II;
 d. telson; e. maxilla II; f. maxilla I.

accessory flagellum 3-segmented, long, reaching about the tip of the article 3 of the main flagellum; gnathopods elongated, pair I larger and longer than pair II; basis of both gnathopods, posterior edge with 1 seta only; pereopods without lenticular organs (Hertzog's organs) and with short dactylus; pleopods biramous, with cylindrical endopodite, which overreaches 1/2 the first article of the exopodite; telson larger than long, armed with 2 long apical spines, and 2 shorter external ones, without distal emargination; oostegites on pereopods III-V, long, narrow, without setae.

Materials. 1 ♀ (3.25 mm), holotype, dissected and mounted on coverlips in Faure' medium, and 2 juv., from a fresh-water well near the Village of Gonnosfanadiga, in the plain north of Cagliari (water depth: 6.10 m; water level: 2.50 m; temperature: 19.1° C; pH: 6.5; bottom sediment composed of thin organogenic sandstone); November 3, 1979; coll. Pesce, Silverii and Maggi.

In the same locality, the new species lives in association with other subterranean amphipods as *Salentinella angelieri* Ruffo et Delamare Deboutteville, 1952 and *Niphargus* sp., and the following other groups: asellids isopods (*Microcharon* sp. and *Stenasellus assorgiai* Argano, 1968), cyclopids copepods (*Megacyclops viridis viridis* (Jurine 1820), *Macrocyclops albidus* (Jurine, 1820), *Diacyclops languidoides* s.l. (Lilljeborg, 1901)), arcticoid copepods, ostracods, water mites and gastropods.

Types deposited in the collections of the "Muséum d'Histoire naturelle, Genève", Switzerland.

Derivatio nominis. Named after our friend and colleague Dr. G. Silverii, who took part in numerous collecting trips promoted by our Institute and who collected the new species.

Description. Body slender and elongated, total length 3.25 mm. Pereion, pleon and coxal plates without particular characteristics. Epimeral plates with ventral edge regularly rounded, posterior margin slightly concave, with one slender seta, almost in the middle implanted. Branchial appendages ovoidal, large, with small and short peduncle.

Antenna I short, main flagellum 10-segmented, articles 3-10 with a long aesthetasc; accessory flagellum 3-segmented, reaching about the tip of the article 3 of the main flagellum.

Antenna II, flagellum 5-segmented, fifth article shorter than the others; peduncle without particular characteristics, excretory cone long reaching about 1/2 the article 3.

Maxilla I, with subrectangular inner lobe that reaches about 4/5 the outer lobe, with 2 apical plumose setae; outer lobe with 7 naked spines, palpus with 3 apical setae.

Maxillae II, inner lobe slightly shorter than the outer, each lobe armed with 5 apical setae and numerous hair-like elements on their surface.

Other mouthparts without particular characteristics, as compared to other species of the genus.

Gnathopods of different size, the first larger and longer than the second one, and with a slightly shorter basis. Gnathopod I, basis short, with 1 seta only, on the posterior edge, ischius with 1 seta; merus short, with 2 apical setae and numerous thick setulae; carpus subtriangular, with well defined lower prolongation, provided with 6 apical and subapical setae and numerous thick setulae; propodus, palm index ¹ about 0.44, palmar margin with a series of 7 setae, 4 small bifid spines (2 on the inner and 2 on the outer side), and 3 stout spines (1 on the inner and 2 on the outer side); dactylus slender and slightly longer than 1/2 the propodus. Gnathopod II narrower and shorter than the first;

¹ Evaluation according to Ruffo (1973).

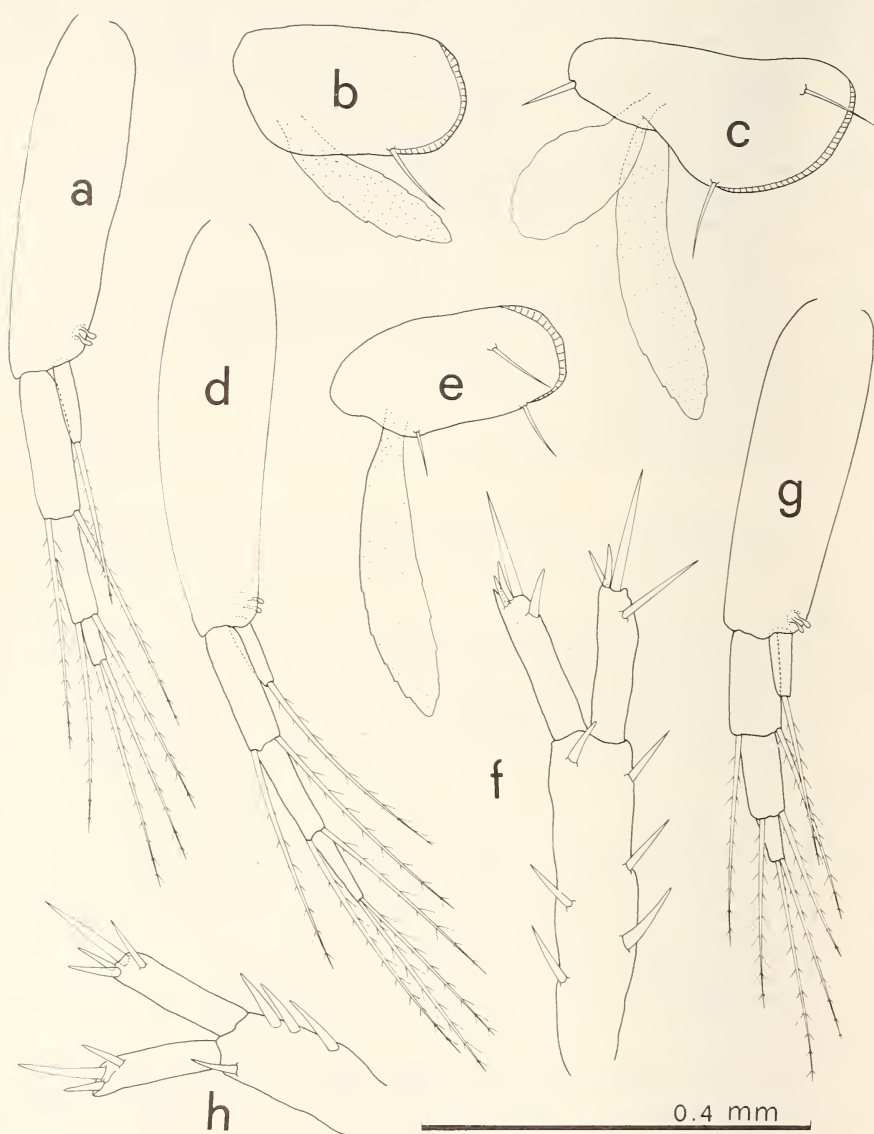


FIG. 2.

Bogidiella silverii n. sp.

a. pleopod I; b. coxal plate IV; c. coxal plate V; d. pleopod II; e. coxal plate III;
f. uropod I; g. pleopod III; h. uropod II.

basis with 1 long seta on the posterior edge; ischius and merus respectively with 1 and 2 setae, both without setulae; carpus elongated, subtriangular, with 8 long setae; propodus, palm index about 0.44, with 11 setae (4 on the outer, 7 on the inner side), 2 stout spines on the lower corner (1 inside and 1 outside) and a row of 5 (inside) small spinulae; dactylus shorter than 1/2 the propodus.

Pereopods, all without lenticular organs, elongated, with narrow basis and with dactylus slightly shorter than 1/2 the propodus; lacking pereopods VII.

Pleopods biramous, with cylindrical endopodite, overreaching 1/2 the first article of the exopodite, and armed with a long apical seta; pleopods 3 shorter than others; peduncle of all pleopods much longer than the exopodite; on all pleopods there are two retinacula with three small denticulations on each side.

Uropod I with equal rami, each about 1/2 as long as the peduncle; peduncle armed with 2 subdistal and 4 marginal spines; rami, each with a group of 4 apical spines, the longer about 5/6 the length of each ramus.

Uropod II shorter than uropod I, with rami about as long as the peduncle; peduncle with 1 subapical spine and a range of 3 spines along the inner margin; each ramus armed with 3-4 apical spines, the longer about 0.70 the length of each ramus.

Lacking uropod III.

Telson larger than long ($L/1 = 0.80$), without posterior concave emargination, and armed with two stout long apical spines, two shorter spines on each side and 3 + 3, subdistally implanted, slender setae.

Remarks. RUFFO (1973) has provided a very useful review, together with a systematic key, for the species and subspecies described in *Bogidiella* (*B.* "group", according to the same A.); following this author the actually known species can be united in four ecological groups: a) mesopsammic marine species; b) littoral interstitial species; c) troglobitic species and d) hyporheic, phreatic, interstitial species.

The new species fits in the last of these groups, being close to *B. skopljensis* Karaman (from phreatic systems of Yugoslavia, Rumania and France), *B. vandeli* Coineau (from Sardinia) and *B. chappuisi* Ruffo et Delamare Deboutteville (from phreatic and interstitial waters of Italy, France, Yugoslavia and Algeria) resp. for the following reasons:

— To *B. skopljensis* it is close for numerous features, as the length of the endopodite of pleopods, the morphology of the gnathopods, the absence of elliptical organs on pereopods, the number of articles of the accessory flagellum of antenna I, the armature of maxilla I and the number of setae on the basis of gnathopods; from this species it differs in having a shorter dactylus on pereopods, four spines on telson (instead of 1 + 1) and oostegites on pereopods III-V (instead of oostegites on pereopods II-V).

— With *B. vandeli* it shares numerous morphological features, as the armature of the outer lobe of maxilla I, the shape of gnathopods, the number of elongated setae on their basis and the armature of telson, differing mainly in having 2 (instead of 3) setae on the inner lobe of maxilla I, shorter dactylus on pereopods, absence of elliptical organs and pleopods biramous (on the other hand, in females of *B. vandeli* there is no trace of endopodite and pleopods are reported as uniramous).

— *B. silverii* n. sp. and *B. chappuisi* resemble each other for several characteristics, i.e. the number of articles of the accessory flagellum of the antenna I, the armature of the inner and outer lobes of maxilla I, the morphology and the palm index of gnathopod II, the number of elongated setae on the basis of both the gnathopods, the shorter dactylus of pereopods and, lastly, the number of spines on telson; from this species, the new species differs mainly for the absence of elliptical organs, the biramous pleopods, the

spines not differentiated on uropod II and for the presence of three pairs of oostegites, on pereopods III-V (instead of four pairs, on pereopods II-V).

From the other known species described from Sardinia, *B. ichnusae*, the new species differs for many morphological features (armature of telson, armature of the maxilla I, absence of elliptical organs, shorter dactylus of pereopods, biramous pleopods, etc.

Moreover, as far as we know, from the *Bogidiella* sp. (cf. *chappuisi*) reported from the Rio Isalle by RUFFO & VIGNA TAGLIANTI (1975), *B. silverii* n. sp. differs by lacking elliptical organs on pereopods.

Lastly, from all the other species in the genus, *B. silverii* n. sp. is easily distinguishable for showing an original assemblage of diagnostic characteristics viz. the biramous pleopods, the number of elongated setae on the basis of gnathopods and the morphology and armature of telson.

RÉSUMÉ

Bogidiella silverii n. sp., nouvel Amphipode des eaux souterraines phréatiques de la Sardaigne méridionale, est décrit.

La nouvelle espèce, qui entre dans le groupe des formes "hyporheiques-interstitielles" d'après Ruffo (1973), se rapproche de *B. skopljensis* Karaman, *B. vandeli* Coineau et *B. chappuisi* Ruffo et Delamare Deboutteville.

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